Panther 24 KTV / 24 KOV / 28 KTV

The boiler's Serial No. is shown on the plate which is attached to the rear side of the control panel. The control panel is accessible after removing the front cover.

In section "Operating Instructions" you will find description of the boiler's main functions and guidelines how to handle the boiler safely. Section "Installation Instructions" is for skilled workers only.

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Introduction

1. The boiler and all associated equipment must be installed and used in accordance with the installation design, all applicable legal regulations and technical standards and with the manufacture's instructions.
2. The boiler may be installed only in an environment for which it is designed.
3. After installation, the boiler may be put into operation by an authorised service organisation only.
4. The boiler complies with regulations applicable in the Czech Republic. When used in the conditions of other countries, any deviations from local regulations must be identified and addressed.
5. In the event of a defect, call a manufacturer's service organisation – any unauthorised interference may damage the boiler (and possibly also associated equipment!).
6. The service technician putting the boiler into operation for the first time must show the user the different parts of the boiler and how to control the boiler.
7. Check whether the delivery is complete.
8. Check whether the model and type supplied is suitable for the required use.
9. Whenever you are not certain how to control the boiler, study appropriate instructions in this Operation and Installation Guide carefully and proceed accordingly.
10. Never remove or damage any markings and signs on the boiler.
11. When making any repairs, only original parts must always be used. It is forbidden to make any changes in the boiler's internal installation, or to interfere with it in any way.
12. When shutting the boiler down for a longer period of time, we recommend to turn the gas supply off and disconnect the boiler from power supply. This recommendation applies in conjunction with the general conditions stipulated in this Operation and Installation Guide.
13. At the end of its useful life, the boilers or its parts must be disposed of ecologically, to avoid causing any harm to the environment.
14. The manufacture disclaims any responsibility for damages caused by the failure to abide by:

- the conditions stipulated in this Operation and Installation Guide;
- applicable regulations and standards;
- proper installation and operation procedures;
- conditions stated in the Warranty Certificate and the Service Book.

Safety of equipment and people

- According to the findings of the Brno National Testing Institute, the boiler (as well as all its optional accessories) complies with the requirements of European Directive 90/396/EEC on gas-fuelled appliances and European Directive 92/42/EEC on efficiency (which are equivalent to Act No. 22/1997 [in the wording of Act No. 71/2000] and Government Decree No. 177/1997 [in the wording of Government Decree No. 287/2000]), and in addition complies with ČSN EN 50 165, ČSN EN 437, ČSN EN 483, ČSN EN 625 and ČSN EN 60 335 – 1; it also complies with ČSN 06 1008 and Act No. 513/1991 the Commercial Code, Act No. 634/1992 and Public Notice of the Ministry of Health of CSR No. 13/1997, as well as its all later amendments.

- In order to run and operate the boiler in accordance with the purpose for which it is designed in actual conditions of use (hereafter referred to only as use), it is necessary to abide also by additional conditions – the most essential ones of which (i.e. those which must not be omitted) are found in the following regulatory documents:

- in the design area: ČSN 06 0310 and ČSN 06 0830 (and for the KOV model also ČSN 73 4201);
- in the fire safety area: ČSN 06 1008;
- for installation and fitting (and repairs): ČSN EN 1755 or ČSN 38 6460, (for the KOV model also ČSN 73 4210), Public Notice No. 48/1982 (as amended) and binding occupational health regulations;
- for running and operation: ČSN 38 6405.

- In addition to the above mentioned documents, it is necessary when using the boiler to proceed in accordance with this Operation and Installation Guide and the accompanying boiler manufacturer's documentation. Any interference by children, persons under the influence of narcotic drugs, certified persons, etc., when using the boiler, must be prevented.

Situations might occur in practice, in which the following essential measures must be adopted:

- prevent the boiler from (even accidentally) being turned on while conducting inspections or working on the combustion gasses flue route or gas and water distribution pipes, by disconnecting the boiler from power supply also by other means than merely turning the main switch off (e.g. by pulling the power cord plug out of power socket);
- shut the boiler down every time when there are any (even temporary) flammable or explosive fumes present on the premises from which combustion air is supplied to the boiler (e.g. from paint when painting, laying and spraying molten substances, from gas leaks, etc.);
- if it is necessary to drain water from the boiler or from the whole system, the water must not be dangerously hot;
- when water is leaking from the boiler's heat exchanger or when the exchanger is clogged up with ice, do not attempt to start up the boiler until normal operating conditions have been restored;
- when gas leak has been detected or the gas supply failed, or if is suspected that this has happened, shut the boiler down, turn the gas supply off and call the gas supply company or a service organisation.

Operating instructions

Controls and signals

Control panel

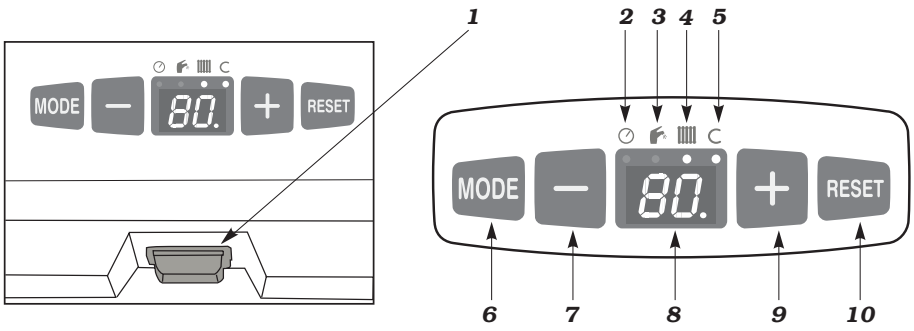


Fig. 1

Main swich

The main swich (Fig. 1, Position. 1) is used to swich the boiler on or off. The main swich underneath the boilers bottom edge, in the control panel centreline

Importent: The boiler must be put into operation and switched on for the first time by an service only!

Control panel

On the boiler's control panel you can monitor current values and set the required parameters.

The control panel has the following control elements (Fig.1):

2. Heating water pressure LED – indicates that pressure is being displayed

3. Hot water LED – indicates hot water temperature setting or display mode

4. Heating water LED – indicates heating water temperature setting or display mode

5. COMFORT hot water heating LED

6. MODE button – used to switch to different reading or value setting modes and to confirm the set values

7. (-) button – used to decrease the value of the parameter being set

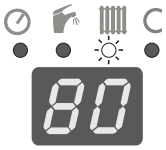
8. Display – displays the values of pressure, temperature, service parameters and error messages

9. (+) button – used to increase the value of the parameter being set

10. RESET button – used to reset the F1 fault status (short of gas)

Selecting Read mode

Displaying heating water temperature



After turning the boiler on with the main switch, the current heating water temperature will appear on the display. This status is indicated by the lit LED underneath the symbol .

Displaying hot water temperature setting

When hot water is running, only the required (set) temperature is displayed on the control panel display. This status is indicated by the lit LED underneath the symbol .

Displaying heating water pressure

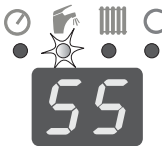
By pressing the MODE button, pressure (in bar) in the heating water system will be displayed for 30 seconds. The LED underneath the symbol lit.

Low heating water pressure alert

When the pressure either drops below 1 bar or exceeds 2.5 bar, the LED underneath the symbol lashing. The boiler remains functional, but the water pressure must be adjusted to the recommended value of 1.2 – 2 bar.

Selecting Setup mode

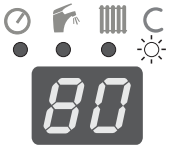
Setting hot water temperature



Press the MODE button repeatedly until the LED underneath the symbol starts flashing. By pressing the buttons set the hot water temperature to the required value. The setting range is --, 40, 42, 45, 48, 50, 52, 55, 58, 60˚C

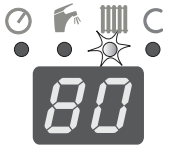
By pressing the MODE button once more, the set value will be saved in the memory. If you wish to disable the hot water heating function, set the value to --.

Setting hot water to COMFORT mode



Press the button. The LED underneath the symbol will start flashing. To disable the COMFORT function, press the button again. For further details see page 11.

Setting heating water temperature



Press the MODE button repeatedly until the LED underneath the symbol starts flashing. By pressing the buttons set the heating water temperature to the required value. The setting range is --, 45, 50, 55, 60, 65, 70, 75, 80, 85˚C.

To set the boiler to the SUMMER mode (hot water heating only), set the value to (--).

Resetting back to factory values

Using main switch (Fig. 1), turn the boiler off. Then press the button and turn the boiler on again with the main switch.

Note: factory set values are shown in Fig. 4.

Equithermal mode – curve slope

Press the MODE button – letter E with the characters (-) and (1) through to (9) attached will appear on the display. By pressing the − + buttons, select the required equithermal curve. The curve's slope grows with the growing number (E1 < E9) – see Fig. 2.

If you wish to turn the equithermal control off, select (E-).

By pressing the MODE button, the selection is saved in the memory and the system switches to the next mode

Note: Equithermal control requires an external sensor to be connected to the boiler, which must not be set to the SUMMER mode. If your boiler does not have an external sensor, the error message code F5 will appear on the display!

Equithermal mode – paralel curve shift

Press the MODE button – letter P with the characters (-) and (1) through to (9) attached will appear on the display. By pressing the − + buttons, select the required shift as described below, or switch the mode off by selecting (P-).
Values with a minus sign are subtracted and values with a plus sign added to the heating water temperature (determined by the equithermal curve as a function of the outdoor temperature). By pressing the MODE button save the setting in the memory and return back to the starting position.

P-	no shift	P5	+3
P1	- 15	P6	+6
P2	- 9	P7	+9
P3	- 6	P8	+15
P4	- 3	P9	+21

Equithermal curves

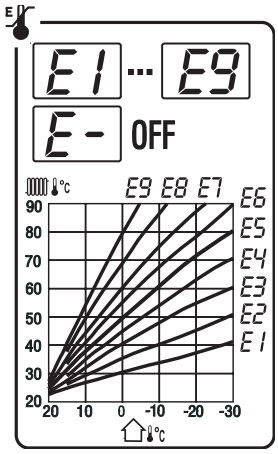


Fig. 2

Parallel curve shift

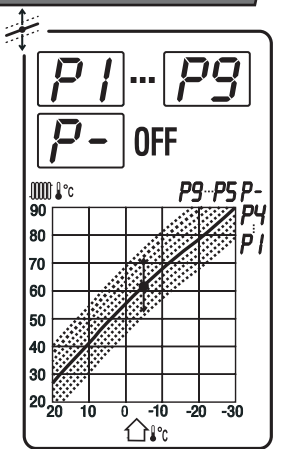


Fig. 3

Example:

• You have selected the E6 curve slope and the outdoor temperature is -10 °C. The corresponding heating water temperature is 73 °C.

• You have selected parallel shift P3... -6 °C, the resultant heating water temperature will be 73 - 6 = 67 °C.

Schematic diagram of boiler

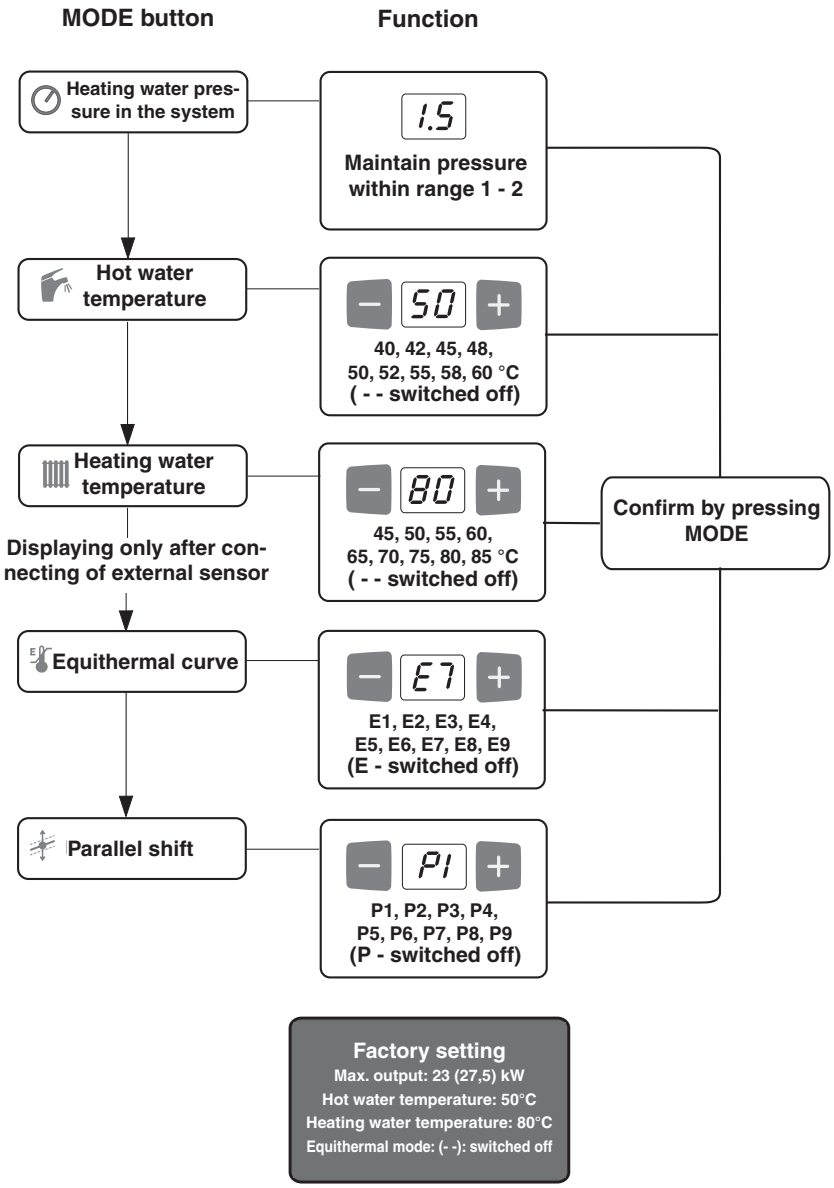

MODE button
Function
Heating water pressure in the system
1.5
Maintain pressure within range 1 - 2
Hot water temperature
50
40, 42, 45, 48, 50, 52, 55, 58, 60 °C (- - switched off)
Heating water temperature
80
45, 50, 55, 60, 65, 70, 75, 80, 85 °C (- - switched off)
Displaying only after connecting of external sensor
Equithermal curve
E7
E1, E2, E3, E4, E5, E6, E7, E8, E9 (E - switched off)
Parallel shift
P1
P1, P2, P3, P4, P5, P6, P7, P8, P9 (P - switched off)
Confirm by pressing MODE
Factory setting
Max. output: 23 (27,5) kW
Hot water temperature: 50°C
Heating water temperature: 80°C
Equithermal mode: (- -): switched off

Fig. 4

Error codes

Loss of heating water pressure - F0

Loss of heating water pressure (below 0.6 bar) in the system. The boiler is automatically shut down – the LED underneath the symbol is flashing. Top up water in the heating system to increase the pressure to 1.2 – 2 bar. After water has been topped up, the boiler will restart itself automatically.

If the too low or too high pressure of the heating water recurs again, call an authorised service..

No flame - F1

There is no flame because gas supply to the boiler has been interrupted – error code F1 is displayed. Check the gas valve below the boiler and restart the boiler by pressing the RESET button (Pos. 10 in Fig. 1). If the fault recurs again, call an authorised service.

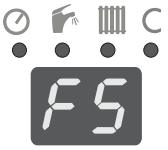
Heating water sensor - F2

Error code F2 is reported when input from the heating water sensor has been lost. The boiler is shut down. Call an authorised service.

Boiler overheated - F3

The boiler has temporarily overheated. The boiler is automatically shut down and waits for the water temperature to drop. The boiler will restart itself automatically after the temperature has dropped to within the operating temperature range. If error code F3 keeps recurring, call an authorised service.

Outdoor sensor - F5



Error code F5 can be displayed only if the boiler has an outdoor sensor connected to it for equithermal control. If this error code is reported, it means that either the connection between the sensor and the boiler has been broken, or the sensor is defective. The boiler is shut down. Call an authorised service.

Until the fault is repaired, the boiler can be run with the equithermal control function disabled (see Controls and signals, Boiler control elements).

Starting the boiler up and shutting it down

Starting the boiler up

Important: Putting the boiler into operation and starting it up for the first time must be done by an authorised service only!

If you wish to start the boiler up after it has been put into operation, make sure that:

1. the boiler is connected to power supply

2. the gas valve underneath the boiler is opened

3. the heating water pressure is within the range 1,2 - 2bar

Turn the main switch (Fig. 1) to the ON position (I). The display lights up.

In the event of a safety boiler shutdown due to the loss of flame, reaction by the emergency thermostat or the combustion gases thermostat (in boiler 24 KOV), error code F1 will appear on the display. If the shutdown was caused by the loss of flame, the boiler can be unblocked by pressing the RESET button. If the emergency shutdown recurs after a short time again, or if the boiler cannot be unblocked by pressing the RESET button, call an authorised service.

If the emergency shutdown was triggered by the emergency thermostat, mere pressing the RESET button will not unblock the boiler. Unblocking the emergency thermostat must be done by an authorised service technician, and this operation cannot be regarded as a warranty repair.

Important: The boiler must not be run with the emergency or the combustion gases thermostat disabled or replaced with a device other than the one specified by the manufacturer.

shutting the boiler down

Turn the main swich (Fig. 1) to the OFF position (0).

If the boiler is to remain shut down for a longer period of time, turn the gas supply valve underneath the boiler off. When shutting the boiler down, take into consideration the ambient temperature in the given season. Unless the boiler is filled in with antifreeze (Alicol Termo), both the boiler and the system could get damaged. In such case drain the hot water distribution pipes completely.

Boiler control

Using the boiler without a room control unit

When running in this mode, the boiler maintains the selected heating water temperature. No room control unit is connected, the terminals for its connection must be interconnected with a jumper (standard factory setting).

Setting procedure:

- turn the main switch to the ON position (I)
- set the required heating water temperature on the control panel

Using the boiler with a room control unit

The boiler maintains the selected heating water temperature. The room control unit wiring terminal jumper is removed and the room control unit is wired to the terminals. The boiler is turned on and off to maintained the set temperature in the room in which the control unit is installed. This room must not have thermostatic valves installed on heating radiators.

When the room control unit turns the boiler on, this status is indicated by a dot after the number shown on the display.

Important: You must set on the boiler control panel a heating water temperature (temperature of the water in the system) which will be capable of covering thermal losses of the building even in low outdoor temperatures. We recommend to select a temperature within the range of 60 - 80˚C.

Using the boiler with equithermal control

The boiler changes the heating water temperature as the outdoor temperature changes.

Important: An outdoor temperature sensor must be connected to the boiler! The outdoor sensor should be located on the coldest wall of the building (facing north or north-west), approximately 2.5 – 3 m above ground level. The sensor must not be exposed to any false heat waves from open windows or ventilation shafts, or to sunshine.

A rule applies when selecting a heating curve that lower number curves are suitable for buildings with good thermal insulation and steeper thermal gradient, and vice versa.

The thermal curve diagram is used as a primary source of information. The system should be fine-tuned by monitoring outdoor and indoor temperatures for a few days.

For first setting of the system choose curve E6.

When setting the system up, all radiator valves must be fully opened, thermostatic valves must be set to maximum temperature and doors and windows must be shut.

Setting the curve slope as well as the parallel shift is done in small increments, and after each step it is necessary to wait roughly 2 hours and then assess the change. It is better to do the setting when the outdoor temperatures fluctuate significantly, and the final setting should be done when the outdoor temperature drops below freezing point.

Setup procedure:

1. Select the “heating water temperature” mode and make sure that the function

SUMMER is not selected (symbol --). You must set a temperature value (this temperature will have no effect on the equithermal control mode).

2. Select the “equithermal mode – curve slope” and set the E6 symbol – see page 6.

3. Select the “equithermal mode – parallel shift” and set the symbol (P-).

4. By pressing the MODE button, save the setting in the memory and return back to the starting position.

After a few days (when the premises have been heated up), readjust the curve slope as required:

5. If the indoor temperature does not significantly changes with outdoor temperature changes, the curve selection was correct. The temperature can be changed to a higher or a lower value by changing the size of the parallel shift – see the part “Controls and signals – Equithermal mode – Parallel shift”.

Important: If the indoor temperature changes significantly with outdoor temperature changes, with the indoor temperature increasing with a dropping outdoor temperature, select a lower value curve and vice versa.

Using the boiler with equithermal control and room control unit

A room control unit extends the equivalent control mode by time control and a heating economy mode (e.g. at night).

Setup procedure:

• set the equivalent control as described above.

• connect the room control unit to the boiler (after removing the wiring terminal jumper) and set the required temperature during the comfortable temperature period on the control unit to about 5˚C higher than the temperature reached by the equithermal control. For economy mode period (at night, when absent), set on the room control unit the actual required temperature – it must be always at least 3˚C lower than the actual comfortable temperature.

Example:

• the (comfortable) indoor temperature maintained by the equithermal control is 21˚C.

• set the room control unit for the comfortable temperature period to 26˚C and for the economy mode period to the actual required temperature, e.g. 16˚C.

Setting the boiler output

The boiler is factory-set to its maximum output.

Important: Output setting may be changed only by an authorised technician.

Hot water heating in COMFORT mode

In this mode the boiler automatically maintains the primary circuit preheated. Using this function will result in getting the hot water supply even faster.

Two control methods are available:

1. Permanent function – the setting is described in section “Controls and signals”. The hot water heat exchanger is continuously preheated to approximately the set hot water temperature value.

Important: The permanent hot water preheating function is enabled only when the system is set to the SUMMER mode (with heating turned off), or during intervals when the boiler is turned off by the room control unit and the equithermal control mode is switched off.

2. Single-action function – this function is activated in the basic mode when the boiler is not heating by opening a hot water tap for a short while (time between opening and closing the hot water tap 2 – 5 seconds).

Important: The single-action COMFORT function is installed on request by an authorised service technician with the boiler in the service mode.

Note: In model 24 KOV, the speed of cooling the preheated hot water heat exchanger is affected by the premises on which the boiler is installed (chimney thrusts, room temperature). Therefore we recommend to select the "permanent" COMFORT function only if you put more emphasis on hot water supply speed than on operation economy.

Protection functios

Protection against freezing

The boiler has a protection system which protects the boiler (but not the heating and the hot water distribution systems) against freezing.

When the heating water in the boiler drops below 10˚C, the boiler pump is automatically switched on. When the heating water temperature drops below 8˚C, the boiler is automatically started up and heats until the heating water temperature reaches 25˚C.

Note: The freezing protection system functions independently from the room control unit and is activated even when the heating system is turned off (set to --)

Important: If the boiler is left in an environment with ambient temperature below 3˚C, the boiler cannot be started up by turning the main switch on.

Pump protection

When the pump is idle for a protracted period of time, switch it on once every 24 hours for a short while (approximately 30 seconds) to prevent it from ceasing.

Anti-cycling

After the boiler has been shut down during the operation, it cannot be restarted before the control system records a drop in the heating water temperature by 8˚C and not before 3 minutes after the shutdown. This function is particularly useful in heating systems where the maximum heat loss is at the level of the lower limit of the boiler's output range.

Disconnecting the boiler from power supply

If the boiler is disconnect from power supply for a protracted period of time (continuously for a month or longer), we recommend to start up the boiler in regular time intervals (at least once a month). If the pump ceases, call an authorised service. Repairing a pump ceased because of dirt in the heating system is not covered by the boiler's warranty.

Note: When the boiler is disconnected from power supply, all its protection functions are disabled.

Power failure

Power failure will turn the boiler off. When power supply is restored, the boiler will automatically restart itself without losing any of the operating parameters settings.

If after power supply restoration the error code F1 is displayed, proceed in accordance with the instructions in section "Controls and signals / Main switch".

The boiler may be blocked because of overheating caused by the pump being switched off as a result of the power failure.

Pump switch-off delay

The pump is factory-set to continue running for 3 minutes after receiving a request from the room control unit to shut the boiler down. When the boiler is used without a room control unit, the pump is switched on permanently.

Safety valve

The boiler is equipped with a safety valve with an opening pressure 3 bar. DO NOT TOUCH THE SAFETY VALVE! If the safety valve starts releasing heating water, always turn the boiler off, disconnect if from power supply and call an authorised service. If the heating system repeatedly looses pressure, consult your service organisation.

Important: All the mentioned electronic protection functions are enabled only when the boiler is connected to power supply (the power cord plug is inserted into a power socket and the main switch is in the ON position (I).

Service and maintenance

Toping up water to the heating system

Water to the heating system (in small quantities) can be topped up through the boiler's top-up valve (Fig. 5).

When topping up water, the following conditions must be met:

1. Pressure of the water being supplied to the boiler must be always higher than the pressure of the water inside the heating system.
2. When toping up water, the boiler must be cold (water temperature must not be higher than 30˚C).
3. Recommended water pressure inside the cold boiler (temperature not more than 30˚C) is 1.2 to 2 bar.

Important: If the pressure in water mains is lower or equal to the pressure of the water inside the heating system, the heating water may run into the water mains, which is forbidden. This danger is reduced by a built-in reverse valve installed behind the top-up valve.

However, the manufacturer disclaims responsibility for any damages caused by incorrect manipulation with the top-up valve and a failure to abide by the conditions specified above. Such damages and defects are not covered by the boiler's warranty.

Procedure of topping up heating water to the boiler:

- make sure that the boiler is connected to power supply and the main switch is in the ON position (I);
- if the display on the boiler's control panel indicates that the heating water pressure is below 0.6 bar, the LED underneath the symbol lights up and error code F0 appears on the display;
- turn-open the blue top-up valve (Fig. 5) with your hand and watch the pressure increase on the control panel display (to see the pressure value on the display, you must press the MODE button);
- when the pressure has reached the required value, turn the top-up valve off with your hand.
- bleed all radiators carefully (water must be running out smoothly and continuously, without any air bubbles);
- leave the automatic bleeding valve cap open all the time (even when the boiler is in operation);
- Check whether the pressure shown on the display is within 1.2 and 2 bar. If necessary, top up the system more.

Cleaning

The boiler cover can be cleaned with a moist cloth and afterwards dried and polished with a dry cloth. Do not use abrasive detergents or solvents.

Upozornění: Before cleaning turn the boiler off with the main switch.

Regular service

To assure continuous and safe running of your boiler, we recommend that the boiler is checked and serviced in regular yearly intervals. These inspections are not covered by the boiler's warranty. The works to be done are specified in the Service Book and must be done by an authorised service.

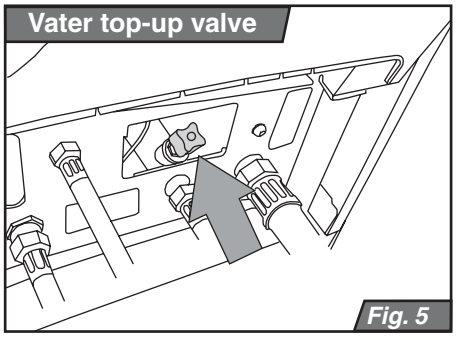


Fig. 5

Warranty and waranty conditions

The PROTHERM Panther 24 KTV, 28 KTV and 24 KOV gas-fired boilers are covered by a warranty defined in the Warranty Certificate, the Service Book and by other conditions specified in this Operation Guide and Installation Guide (chapters Introduction and Boiler installation).

Technical parameters - Model 24 KOV

Category			II_{2H3P}
Version			B_{11BS}
Ignition			electronic
Fuel		Natural gas	propane gas
Max. thermal input	[kW]	25,5	25
Min. thermal input	[kW]	11	10,5
Max. thermal output	[kW]	23,5	22,5
Min. thermal output	[kW]	9,5	9
Efficiency	[%]	90,7	90
Gas consumption (Q max. / Q min.)		2,7 / 1,1 [m^3/h]	2,1 / 0,9 [kg/h]

Gas pressure

Supply pressure	[mbar]	20	37
Nozzle pressure min / max	[mbar]	2,2 / 12,2	7 / 35,7
Nozzle diameter	[mm]	1,2	0,7

Heating

Max. working pressure	[bar]	3
Min. working pressure	[bar]	0,8
Recommended working pressure	[bar]	1,2 – 2
Temperature range	[°C]	45 – 85
Expansion vessel	[l]	5
Max. quantity of heating water in system	[l]	70
Max. pressure in expansion vessel	[bar]	3

Domestic hot water

Max. supply pressure	[bar]	6
Min. supply pressure	[bar]	1
Min. water flowrate	[l/min]	2,7
Adjustable temperature range (flow-dependant)	[°C]	40 – 60
Max flowrate of domestic hot water		
- at Δt 25 °C	[l/min]	12,8
- at Δt 30 °C	[l/min]	10,8
- at Δt 35 °C	[l/min]	9,1

Electrical data

El. voltage / frequency	[V/Hz]	230/50
El power input (max)	[W]	105
El. protection cover		IP 45
El. current	[A]	0,5

Extraction of combustion gases - method into chimney

Flue diameter	[mm]	130
Combustion gases temperature	[°C]	95 - 120
Combustion flow mass	[g/s]	20
Min. required stable chimney draft	[Pa]	2
Noise level (1 m from the boiler at 1,5m height))	[dB]	up to 55
Dimensions - height / width / depth	[mm]	740 / 410 / 320
Weight withou water	[kg]	33

Technical parameters - Model 24 KTV

Category					II_{2H3P}
Version					C_{12}, C_{32}, C_{42}, C_{52}, C_{82}
Ignition					electronic
Fuel			Natural gas		propane gas
Max. thermal input	[kW]		26		25
Min. thermal input	[kW]		11		10,5
Max. thermal output	[kW]		24		22,6
Min. thermal output	[kW]		9,5		9
Efficiency	[%]		91,7		90,5
Gas consumption (Q max. / Q min.)			2,7 / 1,1 [m³/h]		2,1 / 0,9 [kg/h]
Combustion gases flow mass	[g/s]		18		

Gas pressure

Supply pressure	[mbar]		20		37
Nozzle pressure min / max	[mbar]		2,2 / 12,2		7 / 35,7
Nozzle diameter	[mm]		1,2		0,7

Heating

Max. working pressure	[bar]	3
Min. working pressure	[bar]	0,8
Recommended working pressure	[bar]	1 – 2
Temperature range	[°C]	45 – 85
Expansion vesel	[l]	5
Max. quantity of heating water in system	[l]	70
Max. pressure in expansion vessel	[bar]	3

Domestic hot water

Max. supply pressure	[bar]	6
Min. supply pressure	[bar]	1
Min. water flowrate	[l/min]	2,7
Adjustable temperature range (flow-dependant)	[°C]	40 – 60
Max. flowrate of domestic hot water		
- at Δt 25°C	[l/min]	12,8
- at Δt 30°C	[l/min]	10,8
- at Δt 35°C	[l/min]	9,1

Electrical data

El. voltage	[V/Hz]	230/50
El power (max)	[W]	145
El. protection cover		IP 45
El. current	[A]	0,6

Extraction of combustion gases - method turbo

Flue diameter	[mm]	100 / 60 (80 / 80)
Max. length of concentric flue 60/100	[Em]	9
Max. length of separated flue 80 + 80	[Em]	18
Combustion gases temperature	[°C]	115 - 145
Noise level (1 m from the boiler at 1,5m height)	[dB]	up to 55
Dimensions - height / width / depth	[mm]	740 / 410 / 320
Weight without water	[kg]	37

Technical parameters - Model 28 KTV

Category			II_{2H3P}
Version			C_{12}, C_{32}, C_{42}, C_{52}, C_{82}
Ignition			electronic
Fuel		Natural gas	propane gas
Max. thermal input	[kW]	30,5	30,5
Min. thermal input	[kW]	13	13
Max. thermal output	[kW]	27,5	27,5
Min. thermal output	[kW]	11	11
Efficiency	[%]	91,3	
Gas consumption (Q max. / Q min.)		3,21 / 1,1 [m³/h]	2,49 / 1,07 [kg/h]
Combustion gases flow mass	[g/s]	23	

Gas pressure

Supply pressure	[mbar]	20	37
Nozzle pressure min / max	[mbar]	2 / 11,7	6,6 / 35,7
Nozzle diameter	[mm]	1,2	0,7

Heating

Max. working pressure	[bar]	3
Min. working pressure	[bar]	0,8
Recommended working pressure	[bar]	1 – 2
Temperature range	[°C]	45 – 85
Expansion vesel	[l]	7
Max. quantity of heating water in system	[l]	70
Max. pressure in expansion vessel	[bar]	3

Domestic hot water

Max. supply pressure	[bar]	6
Min. supply pressure	[bar]	1
Min. water flowrate	[l/min]	2,7
Adjustable temperature range (flow-dependant)	[°C]	40 – 60
Max. flowrate of domestic hot water		
- at Δt 25°C	[l/min]	15,3
- at Δt 30°C	[l/min]	12,8
- at Δt 35°C	[l/min]	11

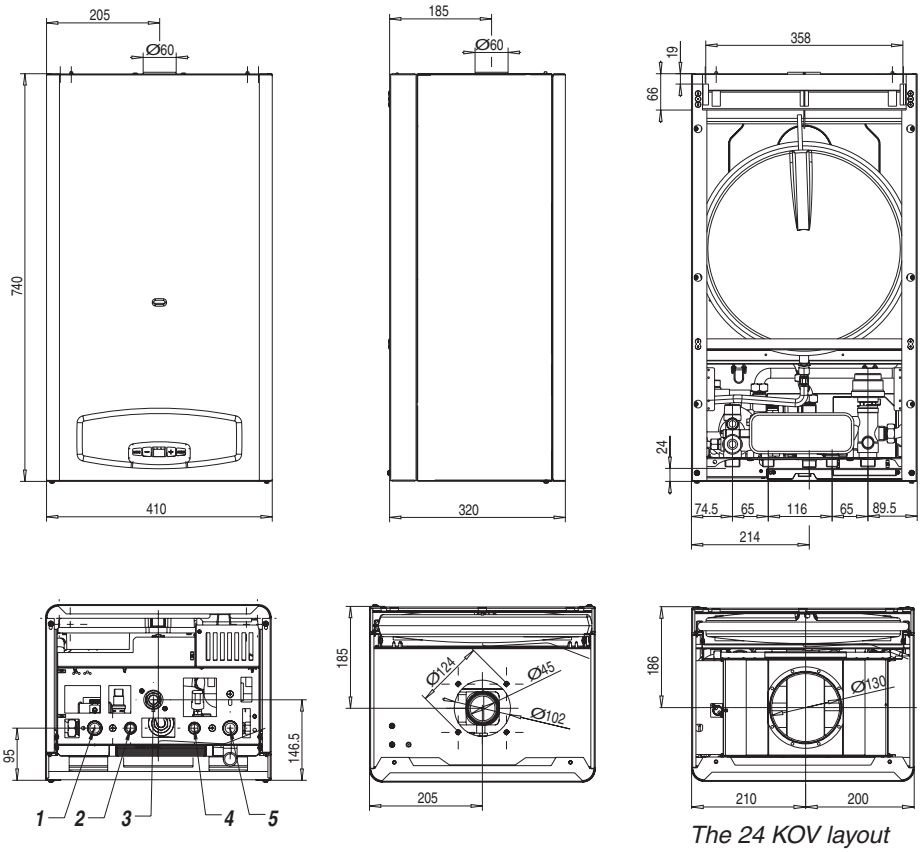
Electrical data

El. voltage	[V/Hz]	230/50
El power (max)	[W]	145
El. protection cover		IP 45
El. current	[A]	0,6

Extraction of combustion gases - method turbo

Flue diameter	[mm]	100 / 60 (80 / 80)
Max. length of concentric flue 60/100	[Em]	5
Max. length of separated flue 80 + 80	[Em]	18
Combustion gases temperature	[°C]	115 - 145
Noise level (1 m from the boiler at 1,5m height)	[dB]	up to 55
Dimensions - height / width / depth	[mm]	800 / 450 / 330
Weight without water	[kg]	39

Connection dimensions - Model 24 KTV (KOV)

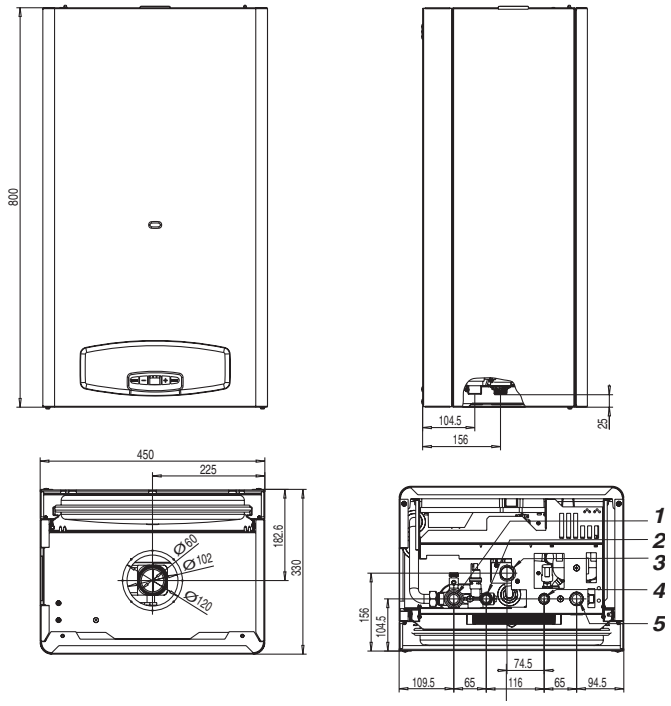


The 24 KOV layout

1. Heating water outlet G3/4“
2. Hot water outlet G1/2“
3. Gas inlet G3/4“´
4. Hot water inlet G1/2“
5. Heating water inlet G3/4“

Fig. 6

Connection dimensions - Model 28 KTV



For description of connection points see 24 KTV (KOV)

Fig. 7

Useable pressure into heating system

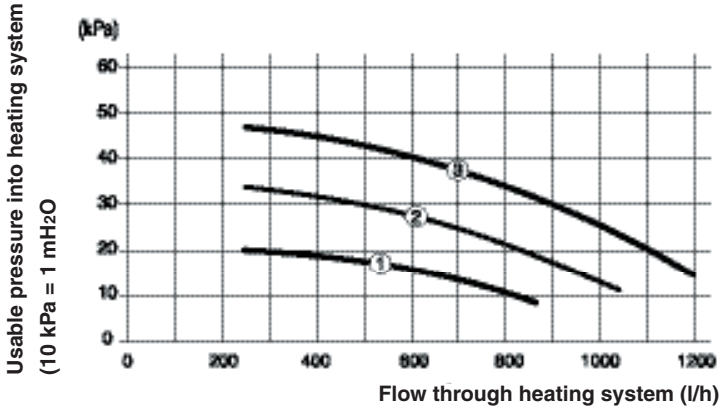
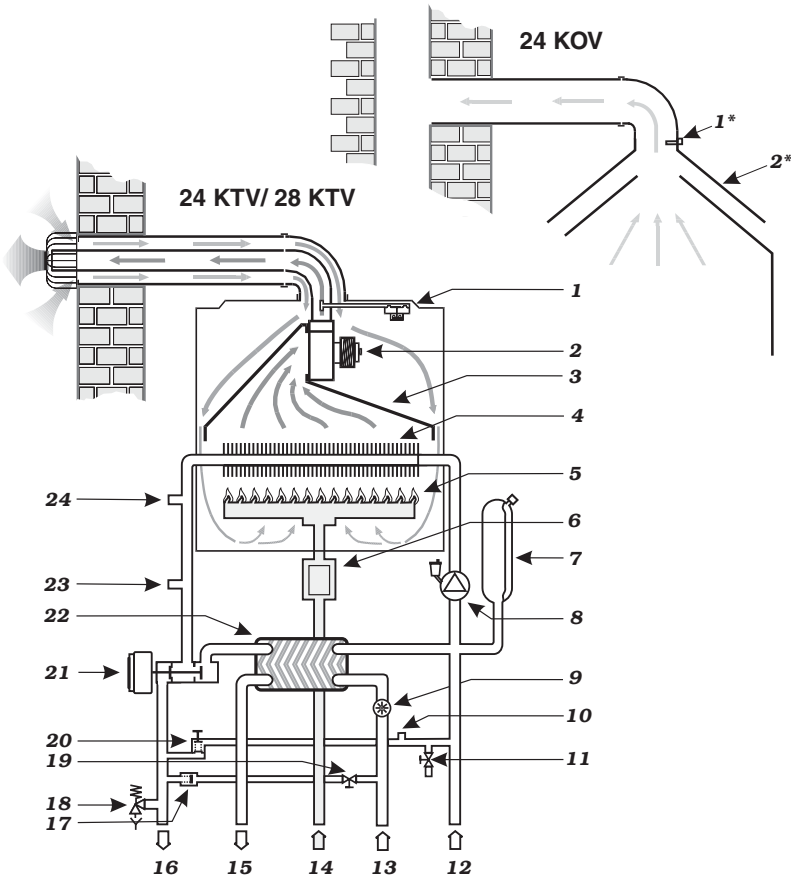


Fig. 8

Boiler operation scheme



1*.Combustion gases thermostat	8. Pump	17. Reverse valve
1. Air manostat	9. Hot water flow detector	18. Safety valve
2*.Thrust breaker	10. Pressure sensor	19. Top-up valve
2. Fan	11. Draining valve	20. Bypass
3. Combustion gas collector	12. Heating water inlet	21. 3-way valve
4. Heating water heat exchanger	13. Hot(cold) water inlet	22. Hot water heat exchanger
5. Burner	14. Gas inlet	23. Heating water temp. sensor
6. Gas valve	15. Hot water outlet	24. Emergency thermostat
7. Expansion vessel	16. Heating water outlet	

Fig. 9

Installation instructions

Introduction

The PROTHERM Panther 24 KTV, 28 KTV and 24 KOV boilers are compatible with common types of hot water heating systems and heating radiators.

Important: The PROTHERM boilers must be put into operation only by authorised organisations according to Czech Bureau of Occupational Safety and Czech Mining Inspectorate Notice No. 21/1979 (in the wording of Public Notice No. 554/1990).

The boiler must be put into operation and warranty and post-warranty service must be performed by the manufacturer's contracted service organisation which meets the above specified requirements.

The boiler is designed to work in a normal AA5/AB5 environment according to ČSN 22 2000-3 and ČSN 33 2000-5-51 (i.e. within temperature range +5 to +40˚C and humidity depending on temperature but maximum 85%).

The 24 KTV, 28 KTV and 24 KOV boilers are suitable for the conditions of zones 1, 2 and 3, in rooms with a bath tub or shower and washing rooms according to ČSN 33 2000-7-71; they may not be installed in zone 0 environment (Fig. 10). When installed in the above rooms, the boilers must be have a protection against electric shock in accordance with the same standard.

The boilers may be (according to Ministry of Health Notice No. 13/1977, i.e. by the noise level) installed in living and communal rooms.

The boilers are designed to run with heating water compliant with ČSN 07 7401 (which under no circumstances can be acidic, i.e. its pH factor must be greater than 7 and must have a minimal carbonate hardness).

Requirements on utility water properties are defined in ČSN 83 0618 (on drinking water in ČSN 75 7111). If the water has a combined calcium and magnesium concentration greater than 1.8 mmol/l, it is useful to implement other "non-chemical" measures against incrustation (e.g. magnetic water treatment combined with a desludging device).

Problems caused by clogging the system with dirt from the heating system or incrustation sediments or problems caused by other clogging (e.g. clogging of the heat exchanger, pump defects) are not cover by the boiler's warranty.

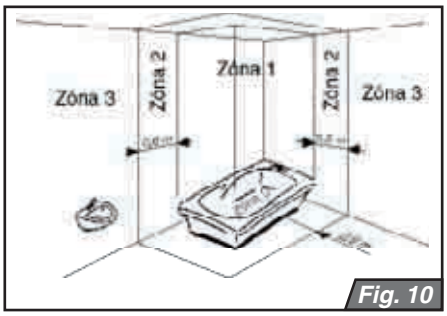


Fig. 10

The distance from flammable materials (e.g. PVC, chipboard, polyurethane, synthetic fibres, rubber and others) must be sufficient so that the surface temperature of these materials does not exceed 80˚C.

Important: Surface temperature of upper parts (particularly the side walls and the cover) of a working boiler might exceed the ambient temperature by up to 50˚C.

A minimum manipulation (free) space maintained around the immediate vicinity of the boiler must be sufficient for a person to work on it safely with bare hands and with common hand tools. Recommended distances are shown in Fig. 11.

In the 24 KTV and 28 KTV models, combustion gases must be always removed and fresh air supplied through a special for this purpose designed dual ducting. Practically any required dual ducting route can be constructed from standard components supplied by the manufacturer. The exhaust route must be constructed in such a way that condensed water vapour contained in the combustion gases can be removed from the ducting. This is done using special components which can be built into the exhaust route. Problems caused by condensate penetration are not covered by the boiler's warranty. Because of the considerable variety of particular solutions, the dual ducting is not part of the boiler delivery and is not included in the price. Principles for route construction are described in chapter Air supply and combustion gases removal ducting.

The 24 KOV is designed for combustion gases to be removed and discharged into a chimney (through a chimney inlet) with a minimum stabilised thrust of 2 Pa. The boiler is connected to the chimney inlet by a flue of a diameter corresponding to the size of the boiler's gas exhaust outlet. It is forbidden to place inside the combustion gases exhaust ducting any objects which impair the combustion gasses flow (e.g. various types of heat exchangers to utilise their residual heat). The combustion gases exhaust ducting is not part of the boiler accessories.

Construction of the combustion gases exhaust ducting as well as that of the chimney must comply with the requirements of ČSN 06 1610 and ČSN 73 4201. Compliance with the requirements specified by these standards will prevent undesirable phenomena from occurring, such as excessive cooling of the combustion gases, penetration of dampness into brickwork and fluctuations in the chimney thrust, and thus prevent undesirable effects on the boiler's functioning.

The boiler takes combustion air from the space in which it is installed. Air must be supplied in sufficient quantity in accordance with applicable regulations.

Installation distances

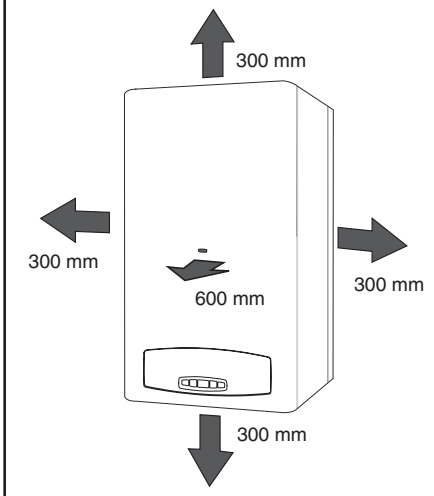


Fig. 11

Delivery completeness

Delivery

The PROTHERM Panther 24 KTV, 28 KTV and 24 KOV boilers are supplied completely assembled and functionally tested.

The delivery includes (Fig. 12):

1. The boiler
2. Operatin and Installation Guide
3. Service Book
4. List of service centres
5. Waranty Certificate
6. An installation bar with fasteners

Special delivery

On request the following accessories can be supplied:

1. Connecting ramp + template, Order No. SP-24KXV17 (Fig. 13)

2. Combustion gases exhaust ducting components diameter 6/100 for model KTV, e.g.:

- S5D-1000 Horizontal set (90˚ flanged elbow, 1 m end-piece), Order No. 7194
- K1D 90˚ elbow, Order No. 2842
- T1D-1000 Extender, Order No. 2825
- S3 Chimney kit (roof end-piece), Order No. 2805
- Z1 Condensate catcher, Order No. 2857

3. Combustion gases exhaust ducting components diameter 80 for model KTV, e.g.:

- S2 Separate set (distributor, 2 × 90˚ elbow, 2 × 1 m end-piece), Order No. 2803
- K2A 90° elbow, Order No. 2830
- T2 Separate duct section (1 m extender), Order No. 2819
- S4 Chimney kit (roof end-piece), Order No. 2809
- Z2 Condensate catcher, Order No. 2858

Content of delivery

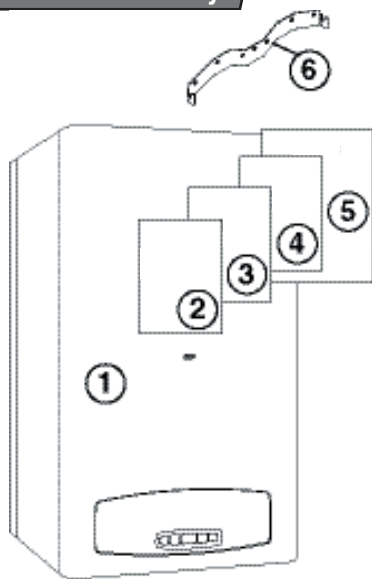


Fig. 12

Connection ramp

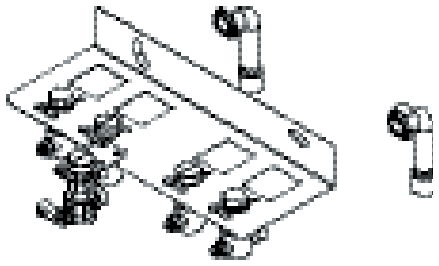


Fig. 13

Preparing for installation

Distribution pipes

Nominal pipe internal diameter is chosen in the usual way, using the pump characteristic. Distribution pipes are designed according to the requirements for the system performance, not according to the boiler's maximum output. The system must allow sufficient flow so that the water temperature difference in the supply and the return pipe is less than or equal to 20˚C. Minimum flow must be 500 l/h.

The piping system construction must prevent air bubbles from developing, making permanent bleeding of the system easier. Bleeding valves should be situated on all high points of the system and on all radiators.

It is recommended to install before the boiler a set of heating water, hot water and gas isolation valves.

Before final installation of the boiler, the heating distribution system pipes must be flushed a few times with pressurised water. In old, already used systems, the flushing must be done in the direction opposite to the flowing heating water.

Important: Before connecting the boiler to the heating system, remove the plastic plugs located inside all connection outlets.

Heating system cleanliness

Before installing a new boiler, it is essential to clean the system thoroughly. In old systems it is necessary to remove all sludge settled at the bottom of radiators (gravity system).

In new systems it is necessary to remove all conservation material used by majority of radiator manufacturers.

It is recommended to install before the boiler (i.e. to the heating water return pipe) a sludge separator. The sludge separator should be constructed in such a way that it is easy to empty in regular time intervals without the necessity to drain a lot of water from the heating system. The separator can be combined with a filter, but a filter with a sieve alone is not a sufficient protection. The filter and the sludge separator must be checked and cleaned regularly.

Heating water circulation

Although the boiler is equipped with a bypass, we recommend to design the heating system so that the heating water flows through at least some of the radiators all the time.

Using antifreeze

We do not recommend to use antifreeze because of their unsuitable properties for the boiler. It is mainly their reduced heat transfer, large volume expansion, aging and adverse effect on rubber parts.

If it is necessary to use antifreeze, we recommend Alicol Termo (manufactured by Slovnaft Bratislava and distributed in the Czech Republic by Slovnaft Praha) – the manufacturer's experience shows that using this material does not reduce the boiler safety and has not any significant impact on the boiler's functioning. If under specific conditions this method of protection against heating system freezing is not possible, then failure to meet the specified functional parameters or any defects of the boiler caused by using a different antifreeze will not be covered by the boiler's warranty.

Thermostatic radiators valves

If a room control unit is installed, at least one of the radiators in the reference room must be without a thermostatic valve. For better temperature comfort we recommend to leave all radiators in the reference room without a thermostatic valve.

Hot water system

Pressure inside the hot water system must be within the range of 1 to 6 bar. If the pressure exceeds 6 bar, a pressure reduction valve must be fitted on the supply side, combined with a safety valve.

In areas with very hard water we recommend to implement suitable measures to reduce the water hardness.

Installing the boiler

Mouting the boiler on the wall

When mounting the boiler on the wall, proceed in accordance with the installation design conditions (e.g. wall load bearing properties, chimney inlet, pipe inlet and outlet connections).

The mounting procedure (Fig. 14):

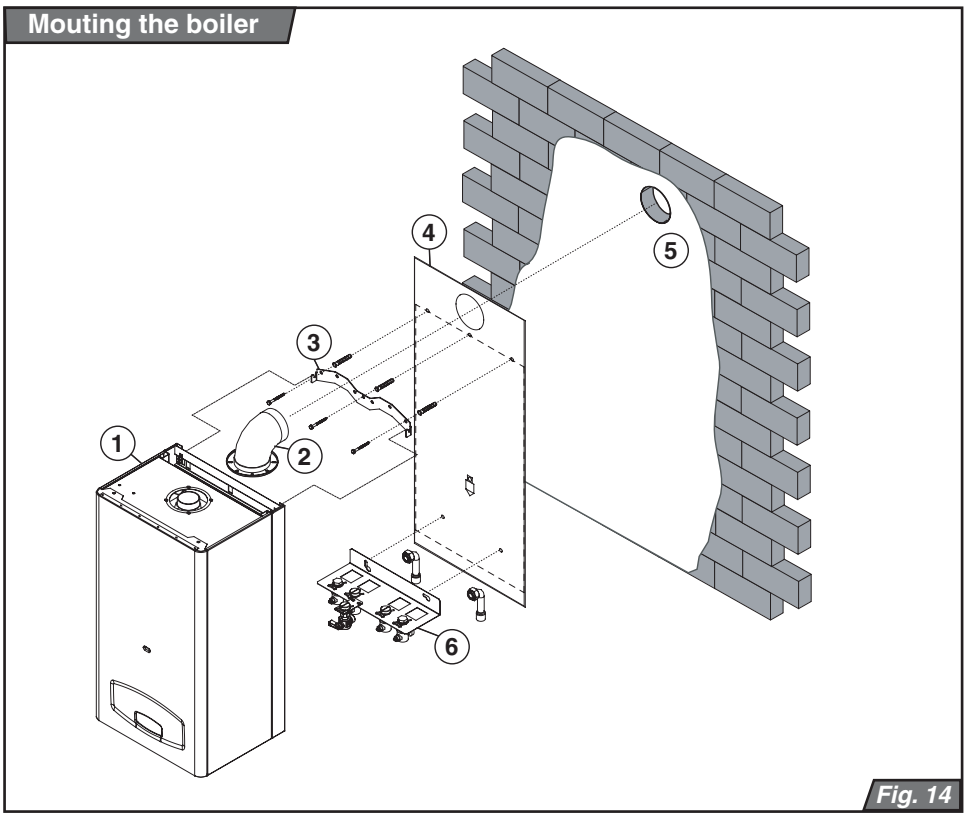
1. Take the paper template (part of the connecting ramp delivery) and attach it (for instance by a sticky tap) to the place on the wall where you want to install the boiler. When positioning the template, user a plumb bob or a spirit level.
2. Using the marked points on the template, drill all necessary holes (mounting bar, connecting ramp).
   Note: Connecting ramp is not part of the boiler delivery.
3. If you are installing a boiler with forced combustion gases removal (KTV), and the gases will discharged directly from the building's façade, project and mark a point for a pass of the concentric ducting.
4. Drill the required holes respecting the diameters shown in the template.
5. Insert wall plugs into the holes for the mounting bar and then fasten the bar properly with the screws provided.
6. Hang the boiler on the mounting bar.
7. If you are installing a KTV boiler, install the combustion gases removal ducting. Fill-in the gaps between the ducting and the wall opening with a non-flammable material.
8. Attach the connecting ramp with wall plugs and screws which are part of the delivery.
9. Connect heating water, hot water and gas distribution pipes to the connecting ramp.
10. Remove plastic plugs and safety clips from all isolation valves.
11. Unscrew the connecting ramp support frame and remove it.
12. Connect the boiler to the isolation valves.

Při zavěšení kotle je třeba dbát na podmínky dané v projektové dokumentaci (např. nosné vlastnosti zdiva, zaústění do komína, vstupy a výstupy rozvodů).

Connecting the boiler to heating water, hot water and gas distribution pipes

The boiler pipe connection pieces must not be subjected to any forces from the heating water, hot water or gas piping system. This requires accurate positioning of all connection pipes, vertically (height) as well as the distance from the wall and mutual distance between inlets and outlets.

We recommend to design the heating system in such a way that when making repairs, it will be possibly to drain the boiler only.



After reconstructions, in unfavourable building dispositions, etc., it is possible to connect the boiler to the heating system, the hot water system as well as the gas mains by means of flexible hoses, but only those designed for this purpose. Flexible components should be as short as possible, must be protected against mechanical and chemical loads and damage, and must be replaced with new ones before the end of their useful life or before their reliability to meet their nominal parameters (as stated by their manufacturers) is diminished.

Operating pressure in the heating system

The heating system (measured on the boiler) must be filled in at least to the hydraulic pressure of 1 bar (corresponds to the hydrostatic water column of 10 m). We recommend to maintain the pressure within the range 1.2 – 2 bar. The expansion vessel capacity is sufficient for up to 70 l of heating water in the heating system (at temperature 85˚C).

Expansion vessel

Before filling up the heating system, check pressure in the expansion vessel. The initial pressure inside the expansion vessel should be by 0.2 bar higher than the assumed pressure in the heating system.

If the heating system is already filled up, it is necessary to shut the heating water valves located underneath the boiler and, using the draining valve, relieve the boiler from pressure. Then you can check the expansion vessel pressure and if necessary increase the pressure.

Important: Make sure that the expansion vessel capacity is sufficient for the volume of water in the heating system (see installation design documentation).

Safety valve

At the bottom of the boiler among the hydraulic group is on the right side located a safety valve (Fig. 15). When the maximum pressure in the system is exceeded, water or steam can be discharged from the safety valve, therefore we recommend to attach a hose to the safety valve, discharging the water into the building's water waste system.

Important: Under no circumstances may anyone manipulate with the safety valve while the boiler is in operation.

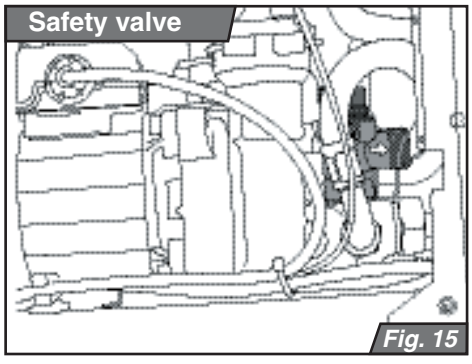


Fig. 15

Connecting gas supply

The ZP (natural gas) version of the PROTHERM 24 KTV, 28 KTV and 24 KOV boilers is designed to be fuelled by natural gas of nominal pressure in the gas mains 2 kPa, for which the calorific value is most commonly stated as being between 9 and 10 kWh/m^3. The indoor gas distribution pipes and the gas meter must be sized adequately, taking into account also the user's other gas appliances.

All gas distribution pipes must be installed in accordance with ČSN EN 1775.

If your boiler is fuelled by propane gas and the gas supply piping is installed below the terrain level, the space around the connection point must be sufficiently ventilated or equipped with a valve which shuts off the section below the terrain level when the boiler flame is off. The valve must also shut when the ventilation fails, i.e. when the forced ventilation system fails or when natural ventilation is monitored by a detector (when the detector sends a warning signal).

Important: The boiler's gas connection point is a ¾" gas valve coupling with a technological flattening. This technological flattening prevents the thread from being sealed in a conventional way by a pipe union and sealers such as for instance "combing", Teflon, paste, etc. The coupling must be sealed by merely tightening the cap nut on the coupling end over an appropriate 24×15×2 flat sealing ring.

After completing the gas supply connection to the boiler, the coupling must be checked for potential leaks.

Toping up boiler water

Toping up water in the boiler is described in the part "Operating instructions – Service/ Maintenance" on page 13.

Filling up the heating system with water

- Make sure that the boiler gas supply valve is closed.
- Unscrew the automatic bleeding valve cap situated on the pump.
- Check and adjust the expansion vessel pressure according to the prescribed static pressure in the system.
- Connect the boiler to power supply.
- Turn the main switch (Fig. 1) to the ON (I) position; about 20 seconds after turning the switch to the ON position, the boiler will shut down, error code F0 will appear on the control panel display and the LED underneath the symbol will start flashing.
- Display orientation values of the heating water system pressure by pressing the MODE button once (see the Pressure display mode on page 5.
- Open the heating system top-up valve and at the same time watch on the display the boiler pressure rising.
- Fill up the system with water, the pressure should be within the range 1.2 – 2 bar.
- Bleed all radiators carefully (water must run smoothly without any air bubbles).
- Leave the automatic bleeding valve cap unscrewed (even while the boiler is running).
- Make sure that the pressure shown on the display is within the range 1.2 – 2 bar. If necessary pressure the system up.
- Open hot water taps to bleed the hot water circuit.

Important: If the pressure inside the boiler is not at least 0.6 bar, the boiler will not start up. If while the boiler is running the pressure inside the boiler drops below 0.6 bar, the protection system will shut the boiler down and the error code F0 will appear on the display. If the pressure indicator LED is flashing, it means that water pressure inside the boiler has dropped below the optimum value, and the pressure inside the heating water system must be adjusted

Draining water from the boiler

The draining valve's main function is to relieve water pressure in the boiler during repairs (Fig. 16). Water from the boiler can be drained using this valve only partially.

Complete draining of water either from the boiler only or from the whole heating system and refilling it again must be done through a fill-up (discharge) point situated in a suitable location in the heating system.

Draining and filling up heating system water and the follow-up operations (bleeding, adjusting expansion vessel) are not covered by the boiler's warranty.

If there is a danger that the hot water system water inside the boiler or the distribution pipes may freeze, measures must be implemented to prevent this from happening.

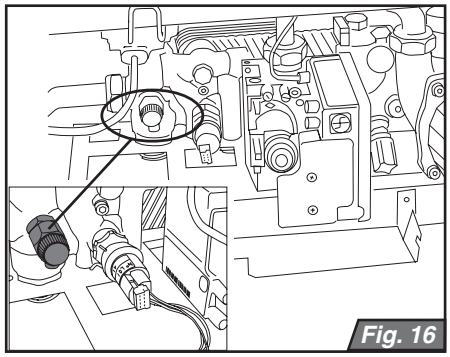


Fig. 16

In the KTV models, combustion gases must always be removed and air supplied through a dual ducting specially designed for this purpose.

Horizontal ducting sections must have a gradient allowing condensate to be discharged to the outside space or to condensate removal components. This is achieved by combining elbows with straight components which will result in a gentle slope of the straight section. Vertical sections must be always fitted with condensate removal components. These must be whenever possible installed in an immediate vicinity of the boiler's combustion gases discharge outlet. Defects caused by condensate penetrations are not covered by the boiler's warranty.

Air supply/combustion gases removal methods (acording to EN 483) and permitted ducting route lengths

Unless stated for the following dual ducting route design methods and their termination outlets otherwise, the ducting route lengths (from the boiler connection point to the termination outlet) must be as specified in Table 1 below.

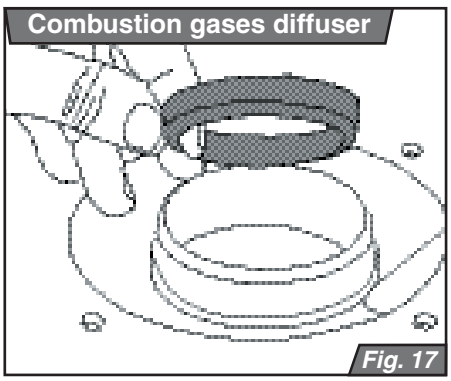


Fig. 17

Note: As 1 Em is regarded either 1 m of straight section or one 90˚ elbow.

Important: : When the lengths specified in Table 1 are exceeded, it is necessary to remove the combustion gases diffuser (aperture) from the fan outlet (Fig. 17).

The following methods of air supply and combustion gases removal are permitted for this boiler:

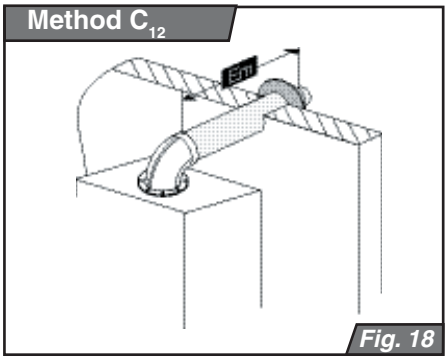


Fig. 18

Method C_{12} – horizontal routes with horizontal termination outlets discharging combustion gases to free space.

When using separate ducting (80 mm) in horizontal routes with horizontal termination outlets, the air supply inlet and the combustion gasses outlet from the same boiler must be situated inside a square of a 0.5 m side.

An example of a dual horizontal ducting route – method C_{12} (according to ČSN EN 483) is illustrated by Fig. 18.

Method C_{32} – vertical routes with vertical termination outlets into free space. For termination outlet of separate ducting, the same applies as for method C_{12}. An example of a dual vertical ducting route – method C_{32} (according to EN 483) is illustrated by Fig. 19.

Method C_{32}

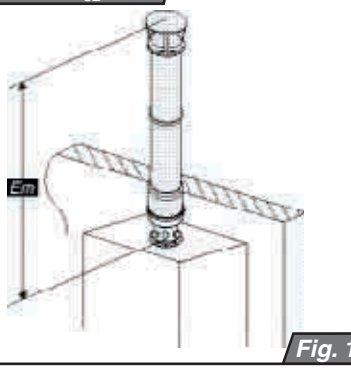


Fig. 19

Method C_{52}

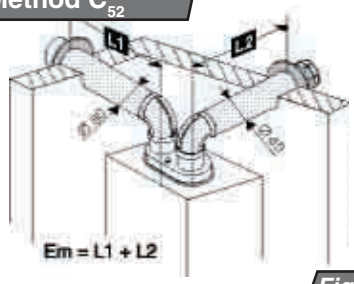


Fig. 20

Method C_{42} – connection to common dual chimneys. Air can be also supplied from free space (or from a space with plentiful air supply). Dual ducting from each boiler (individual routes) may be terminated in a common chimney; the chimney's transportation sufficiency is assessed from the data stated by the manufacturer of the used chimney flue. If the routes are terminated in the chimney in two mutually perpendicular directions, the minimum vertical distance between them must be 0.45 m. If the routes are terminated in the chimney from opposite directions, the minimum vertical distance between them must be 0.60 m. Outlets of routes terminated in a common dual chimney are never fitted with end pieces (used in routes discharging to free space). Both route sections (the outside – air, and the inside – combustion gases) must be safely inserted into the chimney inlet, but not too deep, so that it does not form an obstacle to the flowing combustion gases or air.

In this case a concentric ducting route must not exceed the length of 9 Em (for the 28 KTV 5 Em) and a separate ducting route the sum of the air part and the combustion gases part must not exceed 18 Em (for the 28 KTV 10 Em).

Method C_{52} – dual ducting separated and terminated at two different points (with different parameters, mainly pressures).

Separate ducting can also be used to remove combustion gases and supply combustion air (see Fig. 20). The separate ducting routes must not be terminated at mutually opposite building walls.

Method C_{82} – ducting with the air part terminated in free space and the combustion gases part in a common chimney.

Air may also be taken from free space (or a space with plentiful air supply) and combustion gases discharged into a common chimney (or back into a space with common presence of combustion gases). Into this method falls also the special case described in the second paragraph of section Special cases – see below.

Table 1

Flue diameter	Min. length	Max. length with diffuser	Max. length without diffuser
100 / 60	1,5 Em	3 Em	9 (5) Em
80 / 80	2 x 2 Em	2 x 3 Em	2 x 9 Em

Values in brackets apply to the 28 KTV

Termination of horizontal ducting sections on the building's façade

Terminating horizontal sections on the building's façade is a method which should be used only when there is no other way. Ducting routes may be terminated using the rules described in this Operation and Installation Guide (or in a separate Protherm flue catalogue), or other rules can be applied.

- 2 m above terrain level in publicly accessible places (0.4 m in other places).
- 0.5 m from window sides, permanently opened ventilation openings (grills) or doors.
- Above the top edge of windows, ventilation grills or doors.
- 1 m underneath windows (never under ventilation grills!)
- in depth R under overhangs, balconies and roof edges.

Minimum distance between façade outlets:

- horizontal: 1 m
- vertical: 2 m

Outlets must be always directed in such a way that the discharged combustion gases flow away from the façade into free space (particularly away from windows, ventilation grills, doors). If this is not possible, the following minimum horizontal distances must be maintained:

a) façade-to-façade (i.e. between the outside edge of the outlet cage and the opposite façade) (Fig. 20):

2 m – if the opposite façade has no windows or ventilation grills

1 m – if neither façade has any windows or ventilation grills

4 m – if the opposite façade has windows or ventilation grills (or when it has similar outlets)

b) on adjacent façades, with distance between the outlet axis and a façades parallel to this axis at least:

2 m – if the adjacent façade has windows, windows, ventilation grills or doors

0.5 m – if the adjacent façade has no windows, ventilation grills or doors

Corners smaller than 0.5 m are not taken into account.

All the above distances are measured from the outside edge (frame) of windows, ventilation grills and doors, to the ducting centreline.

Special cases

Outlets may also be situated under overhangs, provided the ducting is extended so that its horizontal length measured from the façade at least touches a circle of radius "R" circumscribed from the corner formed by the overhang and the façade (Fig. 18).

Boiler exhaust ducting may be also terminated in vertical shafts terminated into free space, provided the shaft cross section along its entire length including the open top is at least 1.25 m^2. The shaft must not have any other similar outlets or windows, or ventilation grills.

Vertical outlet (above roof)

Concentric ducting routes as well as separate combustion gases and air supply ducting may be terminated above the building's roof at 0.4 m distances from each other and extending above the top of a 40 cm thick layer of snow (copying the roof outlines).

Permissible exhaust outlet locations

Fig. 21 - Overhangs

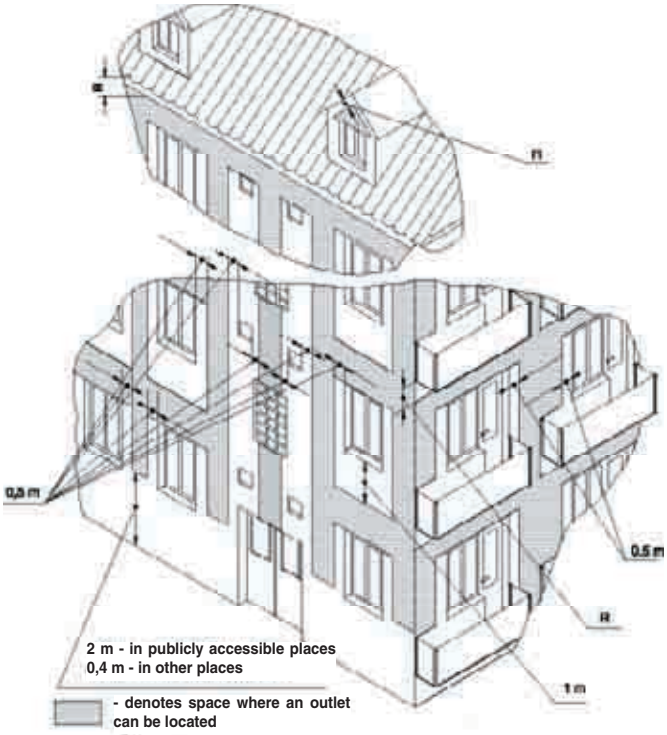


Fig. 22 - Façades

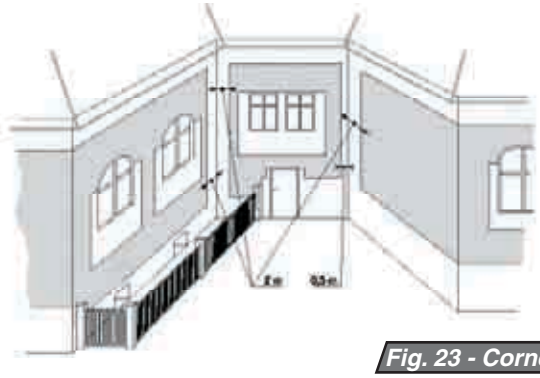


Fig. 23 - Corners

Safety measures

The distance between any flammable material and the combustion gases part of a separate ducting system must be such that the surface temperature of this material does not exceed 80˚C.

Combustion gases outlets must not be located in:

- places with the danger of explosion (as defined by ČSN 33 1220)
- building's interior (attics, corridors, staircases, etc.)
- places which can be closed, e.g. in gateway passages, etc.)
- underground structures (even when they constitute no obstacle and are open), such as tunnels, subways, etc.

The opening through the wall for dual ducting for air supply and flue removal shall be made with adequate clearance (ca 120 to 130 mm) and sealed upon completion of installation. Only incombustible material may be used for sealing (with flammability grade A according to ČSN 73 0823) as e.g. plaster, gypsum etc. Penetrations through flammable wall or ceiling must be made in accordance with the first paragraph of this section.

Electrical wiring

The boiler is connected to power supply by a three-core flexible cord without a plug. A fixed socket through which the boiler is connected to power mains must comply with the provisions of ČSN 33 2000-4-46. It must always have a protective (earth) contact (peg), reliably connected by a PE or PEN wire (yellow-and-green). The boiler must be always connected to the protection wire (earth) through its power cord and must be always installed in such a way that the socket and plug are accessible. Using adapters, extension cords etc., is not permitted.

The boiler has two tubular fuses (T 80 mA/250 V and 1.6 mA/250 V), situated on the boiler's control panel – see the schematic diagrams on pages 35 and 36.

Important: The plug and the socket as well as a room control unit, which requires interfering with the boiler's internal wiring, must be always connected by a qualified electrician as defined by Public Notice No. 50/1978. Likewise servicing of the boiler's electrical system must be done by a person with the above qualification only. Before carrying out any works on its electrical system, the boiler must be disconnected from power supply by pulling the power cord plug from the power socket!

Only zero-potential output room control units may be used with the boiler, i.e. units which send no foreign voltage to the boiler.

Minimum required current carrying capacity of the control unit's output terminals is 24 VAC/0.1 A.

The room control unit must be connected to the boiler by a two-core cable. The recommended copper wire cross-section is 0.5 to 1.5 sq.mm.

The room control unit connection cable must not run in parallel with power wires or cables.

The terminal box for wiring the room control unit, which is factory-fitted with a shortening jumper, is located at the back of the boiler control panel. The terminal box is accessible after removing the external cover and dropping down the control panel (Fig. 24).

Room control unit wiring

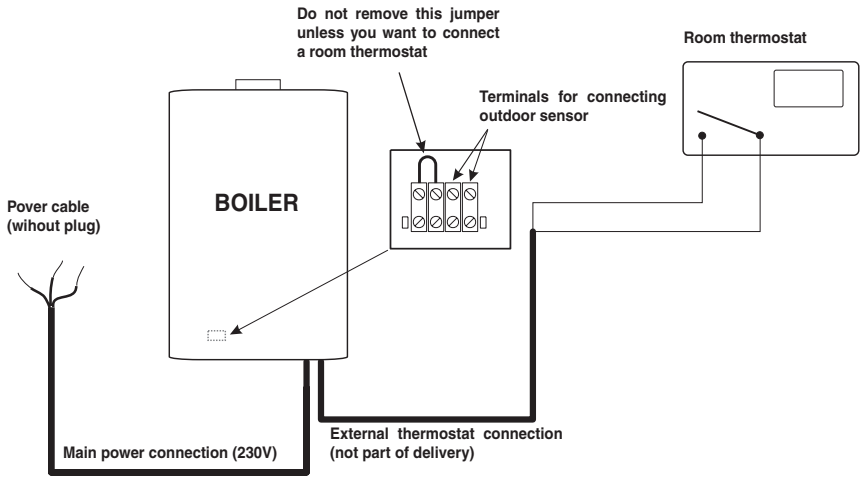

Do not remove this jumper unless you want to connect a room thermostat
Room thermostat
Terminals for connecting outdoor sensor
BOILER
Pover cable (wihout plug)
Main power connection (230V)
External thermostat connection (not part of delivery)

Fig. 24

Converting to different fuel

The Panther 24 KTV, 28 KTV and 24 KOV boilers are in their basic versions designed to use natural gas as fuel. If it is necessary to use propane gas instead, the gas valve must be replaced and the boiler parameters set as specified. The modifications required to switch to a different fuel must be carried out by an authorised technician with a valid manufacturer's certificate. The propane gas valve is part of the conversion kit for switching from natural gas to propane gas. The kit contains all necessary parts and instructions how to do the conversion.

Technical instructions for converting to a different fuel form a separate part of the Service Manual.

Electrical wiring diagram - PROTHERM Panther 24 KOV

Fault codes:
F0 - Loss of system pressure
F1 - No flame
F2 - Heating water sensor failure
F3 - Max. water temperature exceeded
F5 - External sensor failure

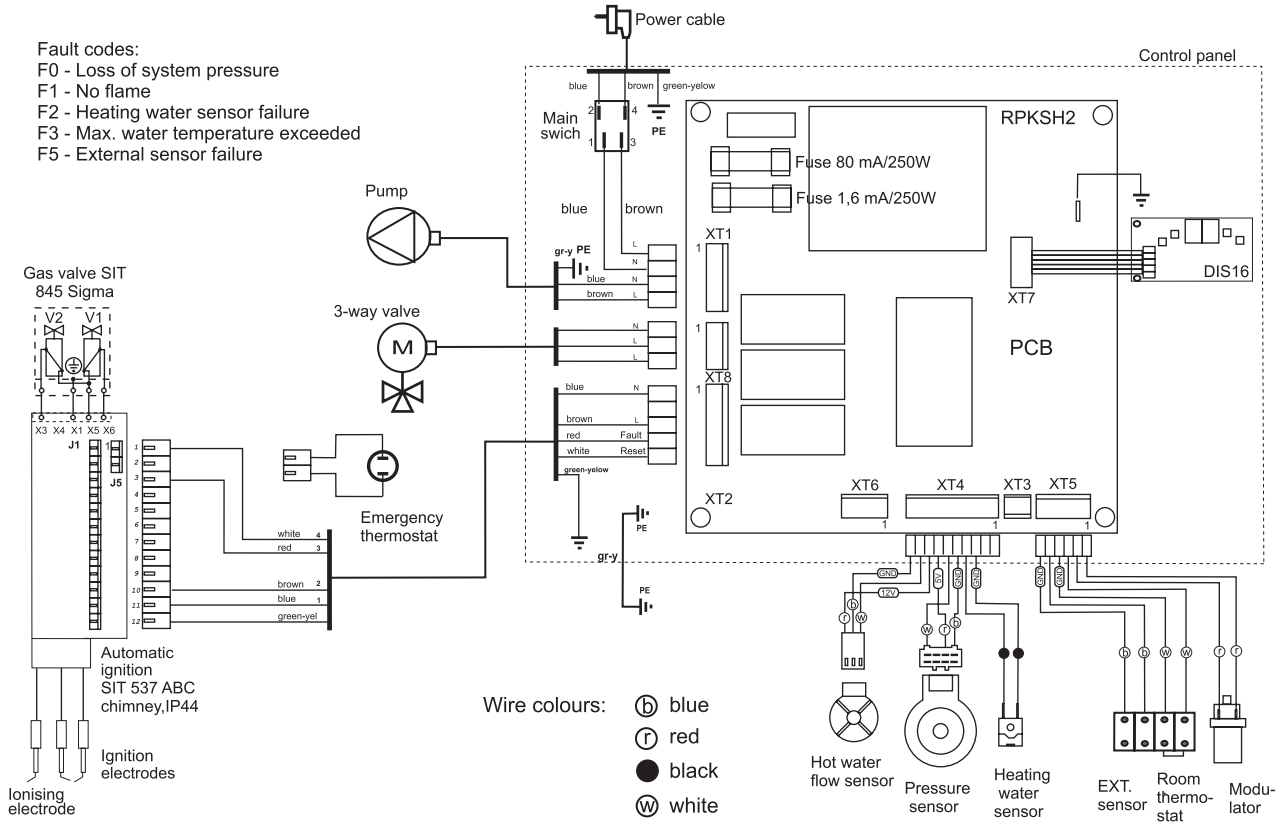


Fig. 25

Electrical wiring diagram - PROTHERM Panther 24 KTV / 28 KTV

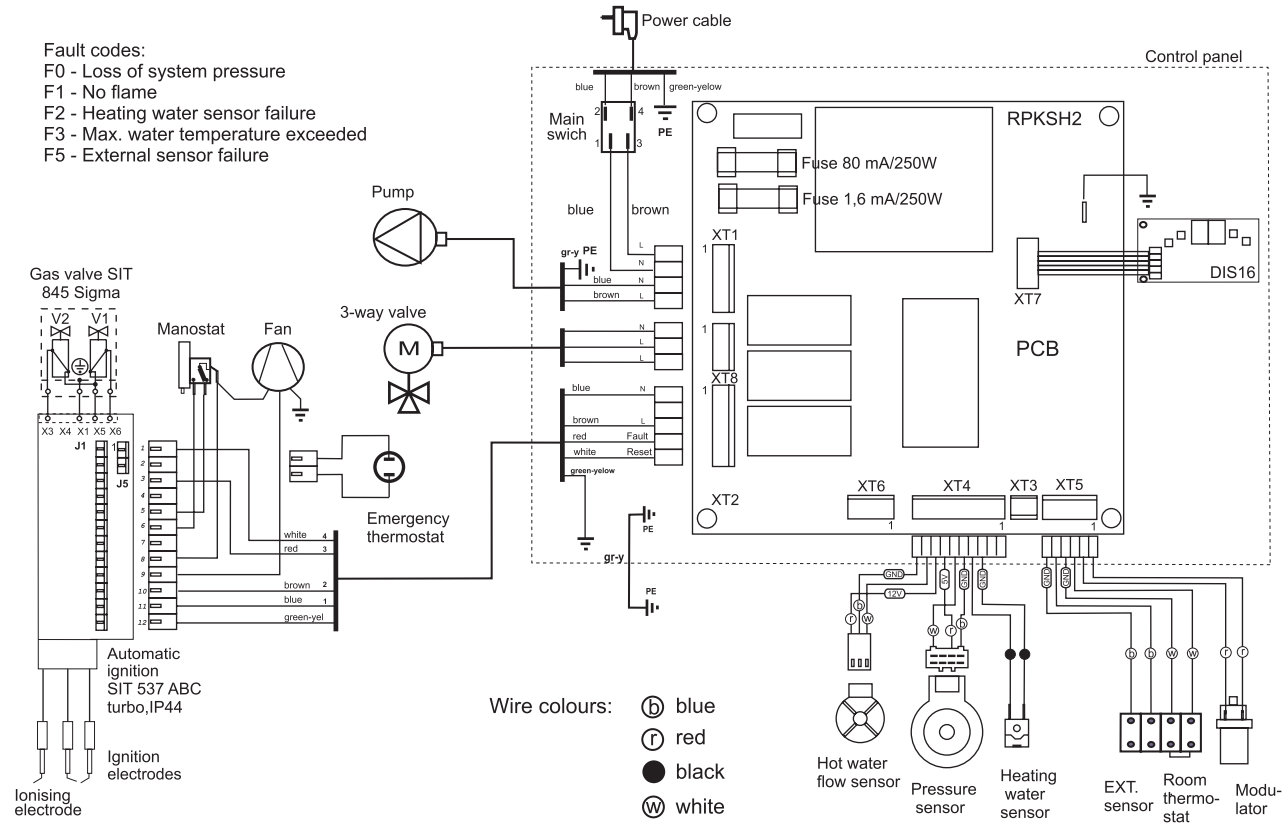


Fig. 26

protherm

Panther 2

User and installation instruction

24 KTV / v.17
24 KOV / v.17
28 KTV / v.17

- Wallhung combined boiler
- Output 9,5 - 23 (11 - 27,5) kW
- Equithermal control

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